TAM & The Internet: An investigation into the changing face of the TAM and its application to Internet Search Engines

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Abstract

Widely accepted for the last 15 years as a reliable method to understand and predict user adoption of Information Systems has been the Davis’ Technology Acceptance Model (TAM). With the advent and meteoric growth of the Internet, a number of researchers are now asking if TAM can be applied to Internet Technologies. The purpose of this paper is to investigate whether TAM is a model upon which a survey can be constructed in regards to users’ acceptance and use of Internet Search Engines.

Keywords
Technology Acceptance Model, TAM, Internet Search Engines,

1. INTRODUCTION

Based on Ajzen & Fishbein’s [Ajzen & Fishbein, 1980] Theory of Reasoned Action (TRA), Davis built TAM: the Technology Acceptance Model, designed specifically to develop sound metrics for “predicting and explaining use” [Davis, 1989] of Information Systems. Accepted now for nearly 2 decades, the TAM has been tested, applied and extended to a plethora of IS situations in dozens of academic papers. The purpose of this paper is to investigate whether the constructs of TAM (1) apply to Internet Search Technologies, and (2) can provide the basis for a proposed survey, designed to investigate user adoption of Internet Search Engines.

1.1 The Big Pictures

The investigations of this paper are part of a 3-pronged inquiry into Computer Human Interaction (CHI) as it applies to Internet Search Engines. The other 2 parts of the research explore the areas of Information & Data Quality, and User Search Behaviour – in the context of Internet Search Engines. Presented here are the initial explorations of TAM as a model for user acceptance and adoption of Search Engines.

What follows is a considered history of TAM and the literature written in regards to it metrics. There are so many academic papers written on TAM that the author could not possibly hope to cover all model developments. Instead, the research highlighted in the Literature Review of the TAM, are the papers the author considers to be historically significant in the evolution of the TAM towards a model germane to Internet Applications.

2. A HISTORY OF TAM

TAM finds it’s foundations in Theory of Reasoned Action (TRA), a social psychology model concerned with the determinants of consciously intended behaviours. [Ajzen & Fishbein, 1980]. The basic connection between the two models is Behavioural Intention (BI). Both TRA & TAM would postulate that user behaviour (in this case – computer usage) is determined by behavioural intent. They differ in that where TRA states a user's behavioural intention is determined by their Attitude (A) and Subjective Norms (SN) ie: what they perceive is the behaviour expected of them by those around them, TAM states a user's behavioural intention is determined by their attitude and Perceived Usefulness of the chosen behaviour.

![Diagram of Theory of Reasoned Action (TRA)](figure1)

![Diagram of Technology Acceptance Model (TAM)](figure2)
2.1 Davis' TAM

The two major constructs of TAM are Perceived Usefulness (PU) and Perceived Ease of Use (PEoU). As stated, TAM differs from TRA in that Perceived Usefulness – not Subjective Norm – is the major determinant of a user's attitude towards an Information System. Davis defines perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her task performance", perceived ease of use refers to "the degree to which a person believes that using a particular system would be free of effort". [Davis et al. 1989]

In the testing of Davis' model [Davis et al.1989; Davis, 1989; Adams et al. 1992], Perceived Usefulness emerged as having a significantly greater correlation with user behaviour than Perceived Ease of Use. However, Davis notes that even if users knew a system to be useful, their perception that it was too hard to use influenced their usage of it. [Davis, 1989].

2.2 Extending the TAM

While TAM was generally accepted by researchers as a sound method for understanding and predicting user behaviour towards IS, subsequent investigations and writings identified a number of weaknesses in the TAM model.

Firstly, TAM was so general that it lacked the constructs to allow for the vast variety of individual differences in users of information systems. [Taylor et al. 1995; Chau, 1996]. Secondly, the basic assumption of TAM is that Behavioural Intention is volitional [Dishaw et al. 1999] which became a major issue in the subsequent years, as more organisations began to mandate Information Systems and Applications [Brown et al. 2002].

TAM's major strength however, was that it lent itself to being tested and extended. Where some authors removed parts of the model – the early 90's saw a progression of publications that all but removed the "Attitude" construct from TAM – other authors added constructs or combined TAM with known constructs from other behavioural models. Table 1 is a Summary of some of the important evolutions to the TAM.

<table>
<thead>
<tr>
<th>Yr</th>
<th>Author &amp; Model</th>
<th>Constructs</th>
<th>Significant TAM developments/summary</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989</td>
<td>Davis &amp; TAM</td>
<td>PU (Perceived Usefulness); PEoU (Perceived Ease of Use); Usage</td>
<td>Perceived Usefulness was found to have a significant correlation with intended system usage</td>
<td>PU→usage; PEoU→usage;</td>
</tr>
<tr>
<td>1991</td>
<td>Davis et al. &amp; TAM</td>
<td>PU; PEoU; A (Attitude); BI (Behavioural Intention); Usage</td>
<td>Perceived ease of use indirectly predicts intended system use, Perceived usefulness predicts system usage intentions, while perceived ease of use is secondary, acting thru perceived usefulness. Attitude was found to have little impact mediating between perceptions and intended use</td>
<td>PEoU→PU; PU→A PEoU→A; A→BI PU→BI; BI→usage</td>
</tr>
<tr>
<td>1991</td>
<td>Mathieson &amp; TAM + TPB</td>
<td>PU; PEoU; A; TPB (Theory of Planned Behaviour)</td>
<td>TAM is psychometrically sound and easy to apply, but omits variables that may be important predictors of usage. TPB may fill in some of TAM's missing pieces when assessing predictors for system usage.</td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>Adams et al. &amp; TAM</td>
<td>PU; PEoU; Usage;</td>
<td>Found that in some cases, PEoU seemed to have little to no effect on intended usage. Suggested initial user difficulties with systems may be attributed to perceived inabilities, rather than system shortfalls.</td>
<td>PEoU→PU PEoU→Usage PU→usage</td>
</tr>
<tr>
<td>1995</td>
<td>Taylor &amp; Todd &amp; TAM &amp; Prior Technology Experience</td>
<td>PU; PEoU; A; SN (Subjective Norm) PBC (Perceived Behavioural Control); BI (Behaviour)</td>
<td>Re-introduced Subjective norm (behavioural intent determined by perceived social expectations) concepts to TAM model. PEoU had a stronger influence on BI if the user had limited IS/IT experience, while PU had a stronger influence on BI if users were experienced with IS/IT. Questions the validity of the Attitudes construct as a significant predictor of intention to use</td>
<td>PEoU→PU, PU→A PEoU→A, A→BI SN→BI, PBC→BI BI→B, PBC→B</td>
</tr>
<tr>
<td>1996</td>
<td>Chau &amp; TAM</td>
<td>Perceived Nt Near-term Usefulness; Perceived Long-term Usefulness; PEoU; BI</td>
<td>Removal the Attitudes construct, determines a better understanding of Perceived Usefulness is required to better predict user BI. Refines the PU construct into Perceived Near-term and Long-term Usefulness.</td>
<td>PEU→Near term PU; PEoU→BI, Near term PU→Long term PU; Near term PU→BI; Long term PU→BI</td>
</tr>
<tr>
<td>1998</td>
<td>Lederer et al. &amp; TAM &amp; Internet</td>
<td>PU; PEoU; Web Usability Principles; Information Task Focus</td>
<td>The principles of TAM seem to apply to BI of Internet users... however, special consideration is required regarding what usefulness and ease of use principles are specific to the Web</td>
<td></td>
</tr>
</tbody>
</table>
2.3 TAM & Organisational Standard Operating Environments

The Yrs column in Table 1 clearly demonstrates that proposed modifications to TAM have followed general trends in IS. When Davis first constructed TAM nearly 20 years ago, technology usage was by and large volitional, and this variable was assumed as part of the TRA & TAM models [Davis, F.D., 1986]. Within 10 years of Davis first writing his doctoral dissertation, Information Technologies had not only permeated almost all organisations, adoption of specific technologies had become mandatory in many institutions [Rawstorne et al. 2000]. Standard Operating Environments (SOE’s) became common practice, where users were directed in choice of Hardware, Operating System & Software Applications. Everything from which email to which software was chosen for the user, and systems were fine-tuned to work with the SOE Applications. This removal of system/application choice meant that, if TAM was to be used as a model to measure predicted choice and usage.

Since the mandated situation removes a greater deal of the user’s choice in regards to system use, the Attitude construct becomes a more significant metric than in volitional circumstances. TPB’s Subjective norm become a significant construct, as mandated situations – usually organisational – do include social/institutional expectations of users. Borrowing ideas from Csikszentmihalyi’s ‘flow theory’, Perceived Enjoyment as a significant factor in Internet Playfulness. Extends the TAM with the construct of Perceived Enjoyment.

Develops the constructs of Individual differences and prior experience to develop a model that includes Perceived Enjoyment as a significant factor in Internet Search Engine usage. Considers the role of Computer Self-Efficacy (from Social Cognitive Theory) in systems usage. Self-Efficacy is self-belief in one’s ability to perform a task. Extends TAM with the Information Behaviour model, developing a model where constructs fall into contexts associated with (1) Information Needs, (2) Information Seeking, & (3) Information Use.

Table 1 summarises the extensions that were added to TAM during this phase of IS change. Constructs such as Subjective Norm and Perceived Behavioural Control were added to the model as a way to measure the significance of organisational and work-colleague pressure as motivating factors in intended use [Agarwal & Prasad, 1997].

2.4 TAM & The World Wide Web

The second major growth area in IS since Davis’ dissertation has been the commercialisation of the Internet into the World Wide Web. Personal use of the Web has grown phenomenally. In the U.S., Internet access has grown from 20% of the general population in 1995, to nearly 60% in 2002. [UCLA Center for Communication Policy (CCP), 2003]. The Australian Bureau of Statistics records a similar "domestication of the Internet"
In Australia, with a rise from 16% of Australian households having Internet access in 1998 to 46% by 2002, as the capabilities of Internet Technology and the numbers of users with access to them continue to grow, an understanding of the motivating factors for user intended use (or non-use) becomes increasingly important. The TAM – extended with appropriate variables – can provide a useful insight into user/internet interaction.

2.4.1 Internet related extensions to the TAM

A number of motivational issues are evident when applying the TAM to the context of the World Wide Web and its Search Engines.

1. The issue of Quality – both Information Quality & System Quality
2. The issue of Function – why users are engaging the Internet
3. The issue of Efficacy – how does the user perceive themself or the internet as being able to achieve the purpose for which use is intended.

2.4.2 Information & System Quality

The open architecture of the Internet produces an electronic environment that, although rich in diversity, has no enforced standards in regards to information or system quality. Liawa and Shih elude to this when they extended TAM to include constructs of System Quality [Liawa et al., 2003] and Relevance of information [Shih, 2003]. Both authors, however, do not address the issue of how a negative user perception in regards to quality and relevance affects intended behaviour. This is particularly pertinent when applying TAM to Internet Search Engines.

Early studies into Internet Search Engines reported that more than 30% of user queries generated a zero-hit result [Wang et al. 2003]. With the improved sophistication of Search Engines, this trend has been somewhat reversed, with users now reporting their queries produce far too many results.

These same Information Searching, Retrieval, Indexing & Ranking problems that have plagued Information Retrieval (IR) Systems since the earliest online library systems. Of users of an online library system in 1987, Borgman identified that users had difficulty,

1. understanding how to implement their questions in terms of the system,
2. retrieving substantial portions of the relevant material existing on a topic, and
3. cutting down large retrieval to a manageable amount [Borgman, 1987].

The issues documented by Borgman are said of a traditional online IR System, which has the advantage of being a static, finite collection of data. How much more of a problem is created when the IR System being built and queried is trying to classify a distributed, dynamic, and rapidly growing [Lawrence & Giles, 1998] information resource like the World Wide Web?

Iivonen [Iivonen, 1995] set out to determine what query variables caused the dramatic inconsistencies of Internet Search Engines returns. By analysing and comparing the types of queries that returned the most consistent and the least consistent results, Iivonen determined that the greatest variable was the human actor who interacted with the Search Engine. The evidence suggests that different human actors interpret and handle the same information in different ways, selecting different terms for the same search. Even if the terms chosen to query the Search Engines are consistent, the reason for two searches with the same terms could be very different, which presents a problem for Search Engines if they are going to meet the information needs of the individual user.

The point is this: Perceptions of System and Information Quality has as much to do with the goals of the searcher as a Search Engine's algorithms, or the classification structure of a set of WebPages. Incorporating both objective and subject metrics for perceptions of quality into the TAM should provide for researchers a unique insight into how Internet Search Engines may (or may not) meet the needs of users, and what effect that level of meeting needs has on the way users interact with Search Engines.
2.4.3 Why Users Use the Internet

A major function of the TAM is to help identify motivating factors with regards to Systems Usage. Understanding why people use the internet is therefore essential to identifying the significant relationships between user perceptions and actual usage. A better understanding of a user's purpose for surfing the Web should also help identify the reasons why perceptions in one user cause a different response than the same perceptions in another user. For example, the lack of quality returns from a Search Engine query may have a different cause/effect relationship in one user than another, depending on the purpose of their usage. Barnett suggests when the internet is being used as an *entertainment medium*, difficulty in finding a specific item may have a positive influence on the user. Conversely, when the internet is being used as an *information medium*, difficulty in locating a resource may have a negative influence on a user's perception of the Internet's usefulness [Barnett, 1999].

Interestingly, with up to 85% of users engaging a Search Engine when they specifically want to locate something [Barnett, 1999], it follows then, that there should be an awfully large number of dissatisfied Internet users. However, the high level of return visitor rates to the various Internet Search Engines would suggest this assumption is incorrect. What Barnett advocates is that Internet Search Engines provide a unique example of random positive reinforcement – long believed by psychologists to be the most effective reinforcement to ensure continued behaviour. Those occasional positive outcomes of our Search Engine queries ensure we return to them the next time we wish to find a piece of information on the World Wide Web.

Rose & Levinson suggest that understanding the "why" of user queries is essential to satisfying the user's information needs [Rose & Levinson, 2004]. This is particularly true if the same query – literally, is used to convey a different inquiry – conceptually.

In his extension to TAM, Shih incorporates Choo's Information Behaviour Model for empirically assessing the use of the Internet for goal-directed tasks by office workers [Shih, 2003]. Shih breaks the information/user/internet interaction down into 3 information contexts. (1) Information needs, (2) Information Seeking & (3) Information Use. (see Figure 3). The types of questions Shih then asks in his survey reflect these information contexts. (See Appendix 2). Shih's perceived performance refers to whether the user perceives that they or the Search Engine has the capacity to perform the query of the Information Seeking context, aiding the user to find the information they are looking for.

![Figure 4: Shih's TAM + Information Context for use of the Internet – Shih 2003](image)

2.4.4 Self-Efficacy and Internet Perceptions

The proliferation of home-users with access to the World Wide Web has introduced the concept and processes of electronic informational retrieval to a whole population of end-users who may have had little to no formal training in the use of such technologies [Wang et al. 2003]. This is reflected in the often ineffectual use of Internet Search Engines. Despite clear Help Systems accompanying most Search Engines, users have demonstrated their knack for making rather dubious query strategies. In his analysis of 207 randomly selected web searches, Barnett found that more than 13% of the searches used methods not supported by the specific search engines [Barnett, 1999]. Barnett also found a surprisingly high number of searches that utilised Engine Math (using the "+" and/or "," operators with a query) did so incorrectly, indicating that even users with at least some exposure to database searching still employed ineffective search queries.
Table 2: Summary of Barnett's "How people searched" Analysis – Barnett, 1999

<table>
<thead>
<tr>
<th>method</th>
<th>% of searches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type keywords into search field</td>
<td>36% of 207</td>
</tr>
<tr>
<td>Utilised Engine Math</td>
<td>31% of 207</td>
</tr>
<tr>
<td>- Engine math with only one word</td>
<td>15% of 64</td>
</tr>
<tr>
<td>Phrase Searching</td>
<td>11% of 207</td>
</tr>
<tr>
<td>Boolean logic (use of AND, OR etc)</td>
<td>10% of 207</td>
</tr>
<tr>
<td>Natural Language (asking a question)</td>
<td>10% of 207</td>
</tr>
<tr>
<td>- not supported by this search engine</td>
<td></td>
</tr>
</tbody>
</table>

While a lack of technical skill is often suggested as the reason for ineffectual searches, the number of successful searches by novice users, and the constantly returning Search Engine audience, suggests that user perceptions about failed web-searches have more to do with their own self-efficacy than a problem with the Search Engine, or the need to learn a specific skill.

Self-efficacy is a psychology term used to describe a user's self-perceptions in their ability to perform a specific task, in this case, the task is effective online information retrieval. Successful online searching is a strategy related task, that often requires the searcher to improvise based on the search results obtained [Quinn, 2003]. The effective searcher is able to rethink and modify his or her strategy based on the ongoing interactions with the Search Engine being used. This is a highly cognitive process, involving subjective characteristics such as human memory, motivation, attention, and concentration [Fugmann, 1973]. A process that is unfortunately easily compromised by feelings of self-doubt or negative perceptions regarding the system or results of a search. Vigil suggests that the sheer volume of information available to a searcher can create enough redundancy to engender a state of overload, which can create anxiety and confusion as the user attempts to make sense of the results [Vigil, 1983].

Fully understanding how Self or System efficacy effects user perceptions and motivations regarding engaging search engines is an area still to be thoroughly pursued in the TAM literature. It is quite likely, that users with a high sense of efficacy would view Search Engine failure as due to wrong search terminology and adjust their strategy, while those with a low sense of efficacy may view their failure as being their own inability to use Search Engines [Quinn, 2003]. The effect these perceptions would have on a user's future use of Search Engines still needs to be investigated, and their inclusion into an extended TAM model may offer an insight. Other issues that could be addressed would be how high, low or moderate levels of anxiety would affect Search Engine use. Yee suggests that we in fact need a modest level of anxiety [Yee et al, 2004] in order to recognise when a search strategy is being ineffective. If that anxiety level were to be raised however, the effect that preoccupation and worry might have on a user – while hypothesised by researchers – is yet to be fully supported with empirical data.

3. CONCLUSION & FUTURE RESEARCH

The purpose of this paper was to investigate whether the TAM constructs of perceived usefulness and ease of use could be used to develop a survey in regards to users' acceptance and use of Internet Search Engines. A review of the literature however reveals that the complex nature of user perceptions are relative influences, depending on a user's experience [Taylor et al. 1995], cognitive ability [Quinn, 2003] anxiety levels [Yee et al., 2004], system and information quality [Liawa et al., 2003; Klein, 2001], obligation to use [Rawstorne et al., 2000; Brown et al. 2002], and self-efficacy [Hasan, 2003]. These variables have been addressed somewhat by authors subsequent to the original release of Davis' TAM. Most, if not all, however rely on survey results and the statistical analysis of those results. There is no way to test the answers given by the users, which would be flawed by the user's own perceptions of what concepts like "easy to use" mean.

3.1 The Big Picture

This initial research into the TAM's possible applications to Internet search engines is part of a larger research project called "Building a Prototype for Quality Information Retrieval from the Internet" undertaken by Edith Cowan, Wollongong & Sienna Universities. The author's part of this project is the Computer Human Interaction research, which has been broken down into three areas. (1) Information Quality, (2) User Technology Acceptance, and (3) User Information Search/Retrieval Behaviour. It is hoped that each of the three areas will feed ideas, data and statistics into each other. For example, the TAM research could be used to develop an extensive survey addressing many of the issues identified in this paper, the results of this survey would then not only be tested using standard statistical analysis methods, but would also be tested against a user-log record – a common methodology for research into Information Retrieval. Anomalies in survey answers could then be identified, eliminating all but the most consistent data. For example, a user who indicates that the system was
easy to use, but whose log-record indicates they had to revise their search on numerous occasions could then be
sent a second survey asking for clarification of his or her answers. An Information Quality (IQ) Survey could be
built around specific search-tasks. Click throughs and selection choices – indicated on the user logs – could be empirically tested against survey results from both the IQ and TAM surveys, and so on.

The project is a considerable one, with associated goals perhaps a little grandiose to realise without extensive
corporate backing. The research area identified in this paper as being lacking however still requires
investigation. Bringing together the type of data generated from a survey and comparing it to physical log-
records provides a unique opportunity to compare objective and subject research into Computer Human
Interaction – as it applies to users and Internet search engines.

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### APPENDIX 1: DAVIS' ORIGINAL SURVEY QUESTIONS FOR THE TAM

**Final Measurement Scales for Perceived Usefulness**

<table>
<thead>
<tr>
<th>Perceived Usefulness</th>
<th>likely</th>
<th>unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using CHART-MASTER in my job would enable me to accomplish tasks more quickly</td>
<td>extremely</td>
<td>quite</td>
</tr>
<tr>
<td>Using CHART-MASTER would improve my job performance</td>
<td>extremely</td>
<td>quite</td>
</tr>
<tr>
<td>Using CHART-MASTER in my job would increase my productivity</td>
<td>extremely</td>
<td>quite</td>
</tr>
<tr>
<td>Using CHART-MASTER would enhance my effectiveness on the job</td>
<td>extremely</td>
<td>quite</td>
</tr>
<tr>
<td>Using CHART-MASTER would make it easier to do my job</td>
<td>extremely</td>
<td>quite</td>
</tr>
<tr>
<td>I would find CHART-MASTER useful in my job</td>
<td>extremely</td>
<td>quite</td>
</tr>
</tbody>
</table>

**Perceived Ease of Use**

<table>
<thead>
<tr>
<th>Perceived Ease of Use</th>
<th>likely</th>
<th>unlikely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning to operate CHART-MASTER would be easy for me</td>
<td>extremely</td>
<td>quite</td>
</tr>
<tr>
<td>I would find it easy to get CHART-MASTER to do what I want it to do</td>
<td>extremely</td>
<td>quite</td>
</tr>
<tr>
<td>My interaction with CHART-MASTER would be clear and understandable</td>
<td>extremely</td>
<td>quite</td>
</tr>
<tr>
<td>I would find CHART-MASTER to be flexible to interact with</td>
<td>extremely</td>
<td>quite</td>
</tr>
<tr>
<td>It would be easy for me to become skillful at using CHART-MASTER</td>
<td>extremely</td>
<td>quite</td>
</tr>
<tr>
<td>I would find CHART-MASTER easy to use</td>
<td>extremely</td>
<td>quite</td>
</tr>
</tbody>
</table>
APPENDIX 2: SHIH TAM + INFORMATION CONTEXTS SURVEY QUESTIONS

<table>
<thead>
<tr>
<th>Measures and constructs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceived usefulness (PU, mean = 4.14, S.D. = 0.56)</strong></td>
</tr>
<tr>
<td>- PU1 Using the Internet enables me to accomplish my tasks more quickly</td>
</tr>
<tr>
<td>- PU2 Using the Internet improves my performance when performing my tasks</td>
</tr>
<tr>
<td>- PU3 Using the Internet can increase my productivity when performing my tasks</td>
</tr>
<tr>
<td>- PU4 Using the Internet can enhance my effectiveness when performing my tasks</td>
</tr>
<tr>
<td><strong>Perceived ease of use (PEOU, mean = 3.94, S.D. = 0.57)</strong></td>
</tr>
<tr>
<td>- PEOU1 Learning to use the Internet is easy for me</td>
</tr>
<tr>
<td>- PEOU2 I can use the Internet in a manner that allows me to obtain the information I want</td>
</tr>
<tr>
<td>- PEOU3 My interaction with the Internet is clear and understandable</td>
</tr>
<tr>
<td>- PEOU4 In general, I find the Internet easy-to-use</td>
</tr>
<tr>
<td><strong>Relevance of information needs (RELE, mean = 3.99, S.D. = 0.59)</strong></td>
</tr>
<tr>
<td>- RELE1 I collect timely online information to meet my task’s requirements</td>
</tr>
<tr>
<td>- RELE2 I obtain helpful online information to support my tasks</td>
</tr>
<tr>
<td>- RELE3 I have available online information in performing my tasks</td>
</tr>
<tr>
<td><strong>Attitudes toward using the Internet (A, mean = 4.8, S.D. = 0.54)</strong></td>
</tr>
<tr>
<td>- A1 I like to use the Internet</td>
</tr>
<tr>
<td>- A2 It is pleasure for me to use the Internet</td>
</tr>
<tr>
<td>- A3 It is desirable for me to learn how to use the Internet</td>
</tr>
<tr>
<td><strong>Perceived performance (PP, mean = 3.80, S.D. = 0.64)</strong></td>
</tr>
<tr>
<td>- PP1 I successfully use the Internet to perform my job</td>
</tr>
<tr>
<td>- PP2 I am satisfied with the effect of using the Internet on my job performance</td>
</tr>
</tbody>
</table>

Removed items (the two factor loadings on PU below 0.6)—
- PU5. using the Internet makes my tasks easier;
- PU6. in general, I found the Internet useful when performing my tasks.

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